Antoine C. **Petit**

Current position
Postdoctoral researcher
at Lund University

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– ORCID –
0000-0003-1970-1790

– Nationality –
French

Languages
French – native
English – fluent
Spanish – medium
Swedish – beginner

Programming
– HPC –
C++ & OpenMP
Fortran

– Data analysis –
Python
Jupyter, numpy
Julia, Matlab

– General skills –
Linux, git, bash, LaTeX

Research interests

My research focuses on planet dynamics, particularly in the context of planet formation and close to instability systems. I use analytical and numerical methods to understand how planet interactions shape exoplanetary system architecture. I also have applied my theoretical skills in the context of specific planetary systems in order to understand their history.

Research experience

2019–2021 **Postdoctoral researcher** — Lund Observatory, Lund, Sweden
Collaborators: A. Johansen, M. Lambrechts. Postdoctoral fellowship in observational and theoretical astronomy.

2016–2019 **Post-graduate research** — Paris Observatory, Paris, France
"Architecture and stability of planetary systems",
Supervisors: Jacques Laskar and Gwenaël Boué.

2016 **Master thesis in astrophysics** — Paris Observatory, Paris, France
"First order mean motion overlap in planetary systems",
Supervisor: Jacques Laskar.

2015 **Master thesis in mathematics** — ENS, Paris, France
"Herman resonance in the three-body problem in four dimensions",
Supervisor: Jacques Féjoz.

2014 **Research internship (6 months)** — UCSC, California, USA
"Mixing and transport of metals by turbulence in galactic discs",
Supervisors: Mark Krumholz and Doug Lin.

Education

2016 – 2019 **PhD in Astrophysics** — Paris Observatory, France
Title: "Architecture and stability of planetary systems",
Supervisors: Jacques Laskar and Gwenaël Boué.
Defended the 28th of June 2019.

2016 **Diploma of the École Normale Supérieure (ENS)** — ENS, Paris, France
Most selective research focused university in France.
Specialization in Physics and Mathematics.

2016 **Master degree in Theoretical Physics** — ENS, Paris Observatoy & UPMC, Paris, France
Specialization in celestial mechanics, statistical physics & general relativity.

2015 **Master degree in Mathematics** — ENS, & UPMC, Paris, France
Specialization in dynamical systems and differential geometry.

2013 **Bachelor degree, Physics** — ENS, Paris, France

2012 Accepted 9th at the ENS after competitive exam. Physics department.

2010 – 2012 **Preparatory school in MPSI/MP*** — Lycée du Parc, Lyon, France
Two-year intensive program in advanced mathematics and physics to prepare the national competitive exams for entry to engineering schools.

2010 French Science Baccalauréat (High school diploma) — Grenoble, France

Publications

8 publications (6 as first author). 126 citations, h-index of 5. See the complete list on NASA/ADS.

2020 **The path to instability in compact multi-planetary systems** A&A, 641, A176
A. C. Petit, G. Pichierri, M. B. Davies, A. Johansen

2020 **Resonance in the K2-19 system is at odds with its high reported eccentricities** MNRAS, 496, 3
A. C. Petit, E. A. Petigura, M. B. Davies, A. Johansen

2019 **High-order regularised symplectic integrator for collisional planetary systems** A&A, 628, A32
A. C. Petit, J. Laskar, G. Boué & M. Gastineau

2019 **Nearly Polar orbit of the sub-Neptune HD3167 c: Constraints on a multi-planet system dynamical history** A&A, 631, A28
S. Dalal, G. Hébrard, A. Lecavelier, **A. C. Petit**, et al.

2018 **Hill stability in the AMD framework** A&A, 617, A93
A. C. Petit, J. Laskar & G. Boué

2017 **AMD-stability in the presence of first-order mean motion resonances** A&A, 607, A35
A. C. Petit, J. Laskar & G. Boué

2017 **AMD-stability and the classification of planetary systems** A&A, 605, A72
J. Laskar & **A. C. Petit**

2015 **Mixing of metals by gravitational instability-driven turbulence in galactic discs** MNRAS, 449, 3
A. C. Petit, M. Krumholz, N. Goldbaum & J. Forbes

Role as a reviewer

2017 – Reviewed 10 articles for the leading international astronomy journals : Astronomy & Astrophysics, Monthly Notices of the Royal Astronomical Society, Icarus, SIAM Journal on Applied Dynamical Systems.

Awards and funding

2019 Fysiografen grant : The Fund of the Walter Gyllenberg Foundation : 220,000 kr (21,000 €)

2016 PhD grant from the French government accorded by the ENS.

2012 4-year fellowship as a trainee civil servant at the ENS.

Presentations and Conferences

International conference presentations

The invited presentations are marked with a star ⋆.

2020 **PLATO ESP workshop** Online
Spacing and stability of compacts systems

2018 **PLATO Theory Workshop** Cambridge, UK
Hill stability in the AMD framework

2018 **PNP prospective coloquium** Nice, France
Hill stability in the AMD framework

2017 ⋆ **Exoplanets and Planet Formation** Shanghai, Chine
AMD-stability and the classification of exoplanets

2017 **CELMEC VII** Viterbo, Italie
AMD-stability in the context of first-order MMRs

Seminars

Dec. 2020 **Exoplanets team seminar** — IPAG, Grenoble, France
Resonance and dynamical constraints on the K2-19 system

Nov. 2020 **IPAG/IRAM Seminar** — Grenoble, France
Dynamical constraints on planetary systems architecture

Oct. 2019 **Astronomy department seminar** — Lund, Suède
Architecture and stability of planetary systems

Jan. 2019 **Planet formation meeting** — Lund, Suède
Dynamical constraints on planet formation

2018 **ASD Team seminar** — Paris, France
Hill-stability in the AMD framework

2017 **IMCCE Postdocs and PhD students seminar** — Paris, France
AMD-stability in the context of first-order MMRs

Conference committees

2020 For All Meeting local organization committee — Lund, Sweden

Teaching and Supervision

2020 – 2021 **Teaching Assistant** — Lund University, Sweden
Stellar Structure and Evolution (Master), Topics in Theoretical Astrophysics (PhD-students)

2020 – 2021 **Master project supervisor** — Lund University, Sweden
Supervision of Kaltrina Kajtazi for a 1.5 year master project.
Subject: Capture of planets into mean motion resonances.

2019 **Culture night outreach talk** — Lund University, Sweden
The moons of the Solar System

2018–2019 **Teaching Assistant** — Dauphine University, Paris, France
Exercises sessions of probabilities and Lebesgue integration at Bachelor level (40 hours). Graded all written work, and final written exams.

2013 **Oral examiner** — Lycée Louis le Grand, Paris, France
Mathematics examiner in preparatory classes.

Outreach

2019 **Culture night outreach talk** — Lund University, Sweden
The moons of the Solar System

2017 – 2019 **Introduction to astronomy for secondary school students** — Paris Observatory, France
Bi-annual intervention with a small group students asking questions about my work and astronomy in general.